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## Studying the Effects of Teaching Cognitive and Metacognitive Strategies on Self-regulation Learning and Test Anxiety of Orphan Girl Students

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### Abstract

The research was performed aiming at studying the effects of teaching cognitive and meta cognitive strategies on self-regulation learning of girl students in orphanage centers and at guidance school level. The sample included 20 girl students living in residential centers supervised by Tehran Welfare Organization; 10 of which were assigned in experimental group and 10 in control group. The standardized motivational strategies questionnaire (MSLQ), was administered as pre-test and post-test to collect data. In this process, after the experimental group took the pre-test, they were assigned in an 8-session course in which they learned cognitive and meta cognitive strategies and then the post-test was administered for both experimental and control groups and their scores were compared by T-test. The results showed that: There's no significant difference between the self-regulated learning of orphan girl students who took the cognitive and meta cognitive learning course and that of those who didn't take the course. There's no significant difference between the test anxiety of the orphan girl students who took the cognitive and meta cognitive learning course and that of those who didn't take the course. There's no significant difference in applying the cognitive strategies by the orphan girl students who took the cognitive and meta cognitive learning course and those who didn't take the course. There's no significant difference in applying the meta cognitive strategies by the orphan girl students who took the cognitive and meta cognitive learning course and those who didn't take the course.

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### 1. Introduction

During the education process the student experiences different feelings and emotions such as anxiety. This feeling is mostly a reaction to a hard or unpredictable situation for students. Taking tests, answering teacher's questions and participating in competitions are some of the situations in which the student feels anxious. However, according to educational psychologists this emotion shouldn't be taken as a negative or destructive one. Clark Leonard Hull (1884-1952) proved that providing a little anxiety which is reduced after achievement is a necessary condition for learning (Hergenhahn and Olson, 1976). His theory is about reducing drive or drive stimulus and he

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regards anxiety as an appropriate drive stimulus. According to him very little anxiety wouldn't lead in anxiety and much of it would be destructive; therefore, learners who have average anxiety are more prepared and facilitated to learn.

Speilberger (1981) proposed that anxiety can be regarded as both person intrinsic and task intrinsic; it threatens 'self' as a person intrinsic motivation (Nekouyi, 1998). Fouladi (2003) who worked on the effect of teaching cognitive and metacognitive learning strategies on reducing test anxiety, proposed two crucial aspects of test anxiety found by Deffenbacher and Hazaleus (1985) and Abolghasemi and Najaryan (1999). Deffenbacher and Hazaleus (1985) introduced three interfering sources in creating test anxiety:

- a) Concern which refers to person's negative cognition about his/her performance; in this regard, person compares his/her performance with that of the others.
- b) Emotional aspect that includes autonomic nerves causing muscular tensions, heart beat and respiration.
- c) Task generated interference involving person's preparedness to regard unrelated aspects of a task which leads in inability to solve the problems (Fouladi, 2003).

Abolghasemi and Najaryan (1999) propose three factors effective in creating and intensity of anxiety:

- a) Personal factors including low self-esteem, locus of control, general anxiety, efficacy, failures, inappropriate studying skills and learned helplessness.
- b) Family factors being child rearing methods, parents' high expectations, punishment and blame, lack of encouragement and reinforcement, low economical level.
- c) Institutional factors involving difficult lessons and tests, inappropriate teacher's expectations, test givers, time limits, disturbing factors like light, noise and so on.

As mentioned above family factors play an important role in creating anxiety; therefore, orphan children's anxiety can be related to their emotional problems created by their special life conditions and should be taken to consideration. Masoumi (2006) has quoted from Bender and Yarnel (1941) that due to their clinical symptoms, this group are children referred to as psychopathic or institutional children. Saleh (2000) proposes five characteristics for these children: a) lack of concentration; b) communication problem; c) aggression; d) attachment.

According to Hawton et.al (1989) there are two different levels of disordered thinking in cognitive models of emotional disorders; negative automatic thoughts including mental images while being anxious; and dysfunctional assumptions and rules involving people's general beliefs about the world and themselves. On the other hand, Shoarinejad's (2001) proposed self-regulation principles image a person with strong belief in himself, high sense of responsibility, high level of self-confidence, high control on emotions, high independence, high truthfulness with oneself. Therefore teaching effective learning strategies such as cognitive and metacognitive ones which lead in the students' self-regulated learning could effectively reduce their test anxiety.

Pintrich (1999) proposes two general aspects of metacognition called the knowledge of cognition and self-regulation of the cognition. Regulation strategies are greatly related to control and supervision strategies. According to the Pintrich (1999), learners' supervising their learning and performance based on their assigned goals, requires applying regulation strategies in order to maintain learning and goal in the same direction. Therefore, self-regulated learning as Schunk and Zimmerman (1994) defined it is a process through which the learners systematically conduct their feeling and performance to achieve their learning goals.

Strategy is a general map or a set of operations which are planned to achieve a certain goal. Learning strategies require making some changes in educational plan, e.g. applying questions during and after instruction in order to enhance students' learning rate. Learning strategies involve behaviors and images which are applied to select, organize and integrate new information with previous ones (Weinstein and Mayer, 1986). Two impressive strategies which have been widely used and tested in all aspects are cognitive and metacognitive learning strategies. According to Weinstein and Mayer (1986), cognitive strategies focus mainly on information processing and include rehearsal, semantic elaboration and organization; while metacognitive strategies include the behaviors that the

learner exhibits through learning situation, some of these behaviors help the students to control their attention, anxiety and interest.

Since much research have been performed with students living in normal situations (with their families), there may be a different result orphan students with all emotional and motivational problems. This research was designed and performed to find out the effects of teaching cognitive and metacognitive strategies on these students' self-regulated learning regarding the fact that they suffer from great motivational and emotional problems.

## 2. Method

### 2.1 Participants

20 students living in orphan centers were selected through random sampling from the statistical universe of orphan girl students living in orphan centers of Tehran and studying at guidance school. The mean score of the sample's age was 13. 10 of the students were assigned in experimental group and other 10 were assigned in control group. Both groups took Pintrich and DeGroot's (1990) MSLQ measurement tool as pre-test and the scores were recorded. Then the experimental group was taught the cognitive and metacognitive learning strategies by the researcher and finally MSLQ was again given to both groups and the scores were recorded again.

### 2.2 Measurement

The MSLQ was developed using a social-cognitive view of motivation and self-regulated learning (Pintrich, 2003). In this model, students' motivation is directly linked to their ability to self-regulate their learning activities (where self-regulated learning is defined as being metacognitively, motivationally, and behaviorally active in one's own learning processes and in achieving one's own goals (Eccles & Wigfield, 2002). This framework assumes that motivation and learning strategies are not static traits of the learner, but rather that "motivation is dynamic and contextually bound and that learning strategies can be learned and brought under the control of the student" (Duncan & McKeachie, 2005, p. 117). Said another way, students' motivations change from course to course (e.g., depending on their interest in the course, efficacy for performing in the course, etc.), and their learning strategies may vary as well, depending on the nature of the course. With this theoretical framework in mind, the MSLQ was designed to measure students' motivation and self-regulated learning as they relate to a specific course. That is, the course is seen as the unit of measure, with the idea that the course is ideally situated between the very general level of "all learning activities" and the very specific and unworkable level of "every learning situation within the course" (Duncan & McKeachie, 2005).

The MSLQ consists of 81, self-report items divided into two broad categories: (1) a *motivation* section and (2) a *learning strategies* section. According to the MSLQ Manual: The motivation section consists of 31 items that assess students' goals and value beliefs for a course, their beliefs about their skill to succeed in a course, and their anxiety about tests in a course. The learning strategy section includes 31 items regarding students' use of different cognitive and metacognitive strategies. In addition, the learning strategies section includes 19 items concerning student management of different resources (Pintrich et al., 1991) All told the MSLQ consists of 15 sub-scales, six within the motivation section and nine within the learning strategies section. The instrument is completely modular, and thus the scales can be used together or individually, depending on the needs of the researcher, instructor, or student. Table 1 lists the 15 sub-scales that comprise the MSLQ. *Scoring the Instrument* Students rate themselves on a 7-point Likert scale, from 1 (*not at all true of me*) to 7 (*very true of me*). Scores for the individual scales are computed by taking the mean of the items that make up the scale. For example, the test anxiety scale is composed of five items. A student's score would be calculated by summing these five items and computing the mean. Cronbach's alpha for motivational sub-scales was 0/62 to 0/93 and it was 0/52 to /80 for cognitive strategies' sub-scales (Valleau Achacose, 2002). Pintrich and DeGroot applied factor analysis and Cronbach's alpha to study the validity

and reliability of MSLQ; their findings show that Cronbach's alpha is 0/89 for self-efficacy, 0/87 for intrinsic value, 0/75 for test anxiety, 0/83 for applying cognitive strategies and 0/74 for applying metacognitive strategies.

### 3. Results

Independent-sample T Test was applied to study if there is a significant difference between control and experimental scores.

Table 3.1: Control and experimental groups' differential t-student scores

Variable	Group	Mean	Standard Deviation
Cognitive strategies' application	Experimental	4.5	10.731
	Control	3.5	8.276
Metacognitive strategies application	Experimental	0.5	5.93
	Control	-0.1	5.13
Test Anxiety	Experimental	4.6	4.94
	Control	2	7.6
Self-regulated Learning	Experimental	5.9	26.743
	Control	14.6	28.566
Self-regulation	Experimental	-1.1	3.57
	Control	-1.2	2.04

\* $p \leq 0.05$

The Independent T score for the mean of differential scores of control and experimental groups in applying cognitive strategies variable was 0.23 ( $df=18$ ) and regarding the fact that the significance level was  $p \leq 0.81$  which is more than  $p \leq 0.05$ , with 95% confidence there's no significant difference between control and experimental groups' applying cognitive strategies. According to table 3.1 the mean of experimental group (4.5) was more than that of control group (3.5); therefore the independent variable of teaching learning strategies was effective on participants' application of cognitive strategies but not significantly.

The Independent T score for the mean of differential scores of control and experimental groups in applying metacognitive strategies variable was 0.24 ( $df=18$ ) and because the significance level was  $p \leq 0.81$  which is again more than  $p \leq 0.05$ , with 95% confidence that there's no significant difference between control and experimental groups' applying metacognitive strategies. According to the table 3.1, the difference between experimental and control group due to which the mean of experimental group (0.5) is more than that of control group (-0.1), shows that teaching learning strategies was effective but not significantly.

The Independent T score for the mean of differential scores of control and experimental groups in test anxiety variable was  $t_{.90}$  ( $df=18$ ) and because the significance level was  $p \leq 0.37$  which is again more than  $p \leq 0.05$ , with 95% confidence that there's no significant difference between control and experimental groups' test anxiety. According to the table 3.1, the difference between experimental and control groups due to which the mean of experimental group (4.6) is more than that of control group (2), shows that teaching learning strategies was effective in reducing participants' test anxiety but not significantly.

The Independent T score for the mean of differential scores of control and experimental groups in self-regulated learning was 0.70 ( $df=18$ ) and since significance level was  $p \leq 0.49$  which is more than  $p \leq 0.05$ , with 95% confidence there is no significant difference between control and experimental groups' self-regulated learning. Furthermore, according to table 3.1, the mean of experimental group (5.9) is less than that of control group (14.6), and this shows that teaching learning strategies wasn't effective in their self regulated learning.

The Independent T score for the mean of differential scores of control and experimental groups' self-regulation was 0.07 ( $df=18$ ) and the significance level was  $p \leq 0.94$  which is more than  $p \leq 0.05$  and therefore with 95% confidence there is no significant difference between control and experimental groups' self-regulation. Teaching

learning strategies as being the independent variable seem to have increased the participants' self-regulation but not significantly, since the mean of experimental group (-1.1) is more than that of control group (-1.2).

#### 4. Discussion

Byabangard (2005) regards anxiety as an ambiguous and undesirable feeling. Students naturally feel anxious when faced with school challenges, e.g., taking a test. In fact, researchers have found that most successful students have average levels of anxiety (Bandura, 2001). However, some students are always worried and have high levels of test anxiety and these defects their ability to achieve. Byabangard (2005) proposed that test anxiety can reduce the achievement of almost ten million students. This anxiety can be caused by many factors including parental unreal expectations and students being compared and evaluated with other peers either by school or their own parents. Shaghghi (2003) and Fouladi (2003) proved that teaching learning strategies to students could reduce their test anxiety significantly. However, this research didn't support this result for orphan students. As mentioned before orphan students suffer from general anxiety which is because of their tough conditions including being rejected by their parents, tense relationship with their peers in the center, lack of emotional support and so on. Therefore the self-regulation strategies which should normally reduce test anxiety couldn't do so because of these children's high tension and potential anxiety.

Santrock (2004) defines self-regulation learning as person's producing and leading his/her own thoughts, emotions and behaviors in order to achieve his/her objectives. Personal factors including self-efficacy effects on person's controlling and organizing his/her behavior. According to Festco and McClure (2005), self-efficacy refers to people's belief in controlling their own life. For example a student with low self-efficacy may not prepare him/herself for the exam believing that it doesn't work (Santrock, 2004); whereas, the person with high self-efficacy is more hopeful and therefore successful in accomplishing the tasks. Byabangard (2005) proposes that the students with high educational achievement are often self-regulated learners, e.g., they set their objectives more specifically, applies more strategies for learning, review their learning and evaluate their learning more systematically. Zimmerman (2001) proposed a model for students with low educational achievement to enable them to apply multi stage patterns; this model includes self-evaluation and self-supervision, setting objectives and strategic planning, offering a practical design and observing outcomes and correcting applied strategies. Insignificant difference between the means of differential scores of experimental and control groups in self-regulated learning is in accordance with the result of Tolou Takmili's (2004) research on the effectiveness of teaching learning strategies on students' self-regulated learning. However it doesn't support that of Weinstein and Hume's (1998) work on study strategies for lifelong learning, Theide, Therriault and Anderson's work on the effect of accuracy of metacognitive monitoring on learning the texts and also that of Ebrahimi Ghavamabadi (1998). No significant change in applying cognitive learning strategies doesn't support the results of Ebrahimi Ghavamabadi (1998) and Tolou Takmili (2004) researches. Metacognitive strategies application's not significant change is against what was found by Theide, Therriault and Anderson's research and also by Ebrahimi Ghavamabadi (1998). However this result is in accordance with Tolou Takmili's (2004) research data.

No significant change in applying cognitive learning strategies doesn't support the results of Ebrahimi Ghavamabadi's finding about the effectiveness of learning strategies on students' self-concept (1998) and Tolou Takmili's work (2004) on the effectiveness of teaching learning strategies on students' self-regulated learning. Metacognitive strategies application's not significant change is against the result of Theide, Therriault and Anderson's research and also that of Ebrahimi Ghavamabadi (1998). However this result is in accordance with Tolou Takmili's (2004) research result.

Research shows that orphan students have low level of educational achievement and this could be due to their low level of motivation in learning and studying. One very obvious obstacle which caused their cognitive and metacognitive application not to improve through the process was bad living condition including crowded rooms, not having special place to study, not having a supportive person to observe their learning process and not having enough time and appropriate place to instruct the strategies. Therefore in addition to lack of motivation, which is a



key problem for orphan students, bad living and studying conditions prevents them to apply learning strategies in order to improve their learning.

Anxiety is another outcome of this condition which needs to be reduced so that the students are able to learn and apply the strategies appropriately. Wigfield and Eccles (2002) proposed some techniques like relaxing to reduce children's anxiety. These intervention programs and techniques focus on the worrying nature of anxiety and emphasize on replacing the harmful negative thoughts by positive task-centered thoughts.

Accordingly simply teaching learning strategies to orphan students to make them self-regulated learners isn't applicable and they need to take some courses to reduce their tension and anxiety and improve their motivation to be prepared to take the main courses.

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